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Basin Outlook Reports

and Federal - State - Private Cooperative Snow Surveys

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How forecasts are made

Most of the annual streamflow in the Western United States originates as snowfall that has accumulated high in the mountains during winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Predictions are based on careful measurements of snow water equivalent at selected index points. Precipitation, temperature, soil moisture and antecedent streamflow data are combined with snowpack data to prepare runoff forecasts. Streamflow forecasts are coordinated by Soil Conservation Service and National Weather Service hydrologists. This report presents a comprehensive picture of water supply conditions for areas dependent upon surface runoff. It includes selected streamflow forecasts, summarized snowpack and precipitation data, reservoir storage data, and narratives describing current conditions.

Snowpack data are obtained by using a combination of manual and automated SNOTEL measurement methods. Manual readings of snow depth and water equivalent are taken at locations called snow courses on a monthly or semi-monthly schedule during the winter. In addition, snow water equivalent, precipitation and temperature are monitored on a daily basis and transmitted via meteor burst telemetry to central data collection facilities. Both monthly and daily data are used to project snowmelt runoff.

Forecast uncertainty originates from two sources: (1) uncertainty of future hydrologic and climatic conditions, and (2) error in the forecasting procedure. To express the uncertainty in the most probable forecast, four additional forecasts are provided. The actual streamflow can be expected to exceed the most probable forecast 50% of the time. Similarly, the actual streamflow volume can be expected to exceed the 90% forecast volume 90% of the time. The same is true for the 70%, 30%, and 10% forecasts. Generally, the 90% and 70% forecasts reflect drier than normal hydrologic and climatic conditions; the 30% and 10% forecasts reflect wetter than normal conditions. As the forecast season progresses, a greater portion of the future hydrologic and climatic uncertainty will become known and the additional forecasts will move closer to the most probable forecast.

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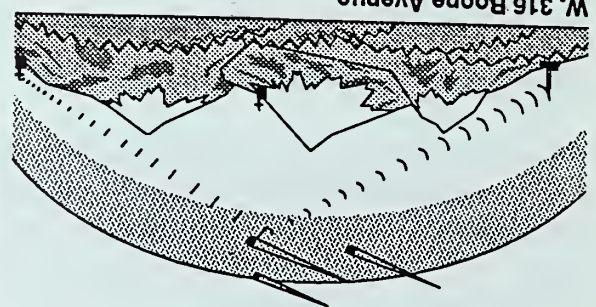
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Basin Outlook Reports

January 1, 1992

United States
Department of
Agriculture
Soil
Conservation
Service



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In addition to basin outlook reports, a Water Supply Forecast for the Western United States is published by the Soil Conservation Service and National Weather Service monthly, January through May. Reports may be obtained from the Soil Conservation Service, West National Technical Center, 511 Northwest Broadway, Room 248, Portland, OR 97209-3489.

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Interpreting Streamflow Forecasts

Introduction

Each month, five forecasts are issued for each forecast point and each forecast period. Unless otherwise specified, all streamflow forecasts are for streamflow volumes that would occur naturally without any upstream influences. Water users need to know what the different forecasts represent if they are to use the information correctly when making operational decisions. The following is an explanation of each of the forecasts.

Most Probable (50 Percent Chance of Exceeding) Forecast. This forecast is the best estimate of streamflow volume that can be produced given current conditions and based on the outcome of similar past situations. There is a 50 percent chance that the streamflow volume will exceed this forecast value. There is a 50 percent chance that the streamflow volume will be less than this forecast value.

The most probable forecast will rarely be exactly right, due to errors resulting from future weather conditions and the forecast equation itself. This does not mean that users should not use the most probable forecast; it means that they need to evaluate existing circumstances and determine the amount of risk they are willing to take by accepting this forecast value.

To Decrease the Chance of Having Too Little Water

If users want to make sure there is enough water available for their operations, they might determine that a 50 percent chance of the streamflow volume being lower than the most probable forecast is too much risk to take. To reduce the risk of not having enough water available during the forecast period, users can base their operational decisions on one of the forecasts with a greater chance of being exceeded (or possibly some point in-between). These include:

70 Percent Chance of Exceeding Forecast. There is a 70 percent chance that the streamflow volume will exceed this forecast value. There is a 30 percent chance the streamflow volume will be less than this forecast value.

90 Percent Chance of Exceeding Forecast. There is a 90 percent chance that the streamflow volume will exceed this forecast value. There is a 10 percent chance the streamflow volume will be less than this forecast value.

To Decrease the Chance of Having Too Much Water

If users want to make sure they don't have too much water, they might determine that a 50 percent chance of the streamflow being higher than the most probable forecast is too much of a risk to take. To reduce the risk of having too much water available during the forecast period, users can base their operational decisions on one of the forecasts with a smaller chance of being exceeded. These include:

30 Percent Chance of Exceeding Forecast. There is a 30 percent chance that the streamflow volume will exceed this forecast value. There is a 70 percent chance the streamflow volume will be less than this forecast value.

10 Percent Chance of Exceeding Forecast. There is a 10 percent chance that the streamflow volume will exceed this forecast value. There is a 90 percent chance the streamflow volume will be less than this forecast value.

Using the forecasts—an example

Using the Most Probable Forecast. Using the example forecasts shown below, users can reasonably expect 36,000 acre-feet to flow past the gaging station on the Mary's River near Deeth between March 1 and July 31.

Using the Higher Exceedance Forecasts. If users anticipate a somewhat drier trend in the future (monthly and seasonal weather outlooks are available from the National Weather Service every two weeks), or if they are operating at a level where an unexpected shortage of water could cause problems, they might want to plan on receiving only 20,000 acre-feet (from the 70 percent chance of exceeding forecast). In seven out of ten years with similar conditions, streamflow volumes will exceed the 20,000 acre-foot forecast.

If users anticipate extremely dry conditions for the remainder of the season, or if they determine the risk of using the 70 percent chance of exceeding forecast is too great, then they might plan on receiving only 5000 acre-feet (from the 90 percent chance of exceeding forecast). Nine out of ten years with similar conditions, streamflow volumes will exceed the 5000 acre-foot forecast.

Using the Lower Exceedance Forecasts. If users expect wetter future conditions, or if the chance that five out of every ten years with similar conditions would produce streamflow volumes greater than 36,000 acre-feet was more than they would like to risk, they might plan on receiving 52,000 acre-feet (from the 30 percent chance of exceeding forecast) to minimize potential flooding problems. Three out of ten years with similar conditions, streamflows will exceed the 52,000 acre-foot forecast.

In years when users expect extremely wet conditions for the remainder of the season and the threat of severe flooding and downstream damage exists, they might choose to use the 76,000 acre-foot (10 percent chance of exceeding) forecast for their water management operations. Streamflow volumes will exceed this level only one year out of ten.

| UPPER HUMBOLDT RIVER BASIN | | | | | | | | |
|----------------------------------|-----------------|--|----------|---------------------|----------|----------|----------|----|
| STREAMFLOW FORECASTS | | | | | | | | |
| FORECAST POINT | FORECAST PERIOD | <-----DRIER----- FUTURE CONDITIONS -----WETTER-----> | | | | | | |
| | | ----- Chance of Exceeding ----- | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | 30% | 10% | 25 YR. | |
| | | (1000AF) | (1000AF) | (1000AF) (% AVG.) | (1000AF) | (1000AF) | (1000AF) | |
| MARY'S RIVER nr Deeth | MAR-JUL | 5.0 | 20.0 | 36 | 77 | 52 | 76 | 47 |
| | APR-JUL | 8.0 | 17.0 | 31 | 74 | 45 | 67 | 42 |
| LAMOILLE CREEK nr Lamoille | MAR-JUL | 6.0 | 16.0 | 24 | 79 | 32 | 43 | 31 |
| | APR-JUL | 4.0 | 15.0 | 22 | 75 | 30 | 41 | 30 |
| NF HUMBOLDT RIVER at Devils Gate | MAR-JUL | 6.0 | 12.0 | 43 | 73 | 74 | 121 | 59 |

For more information concerning streamflow forecasting ask your local SCS field office for a copy of "A Field Office Guide for Interpreting Steamflow Forecasts".

WASHINGTON WATER SUPPLY OUTLOOK

JANUARY 1992

GENERAL OUTLOOK:

WASHINGTON WATER SUPPLY OUTLOOK REPORT CURRENT AS OF 1/10/92
THE SNOWPACK VARIES FROM 80% IN THE GREEN RIVER BASIN TO 125% IN THE CHELAN BASIN. WASHINGTON'S SNOTEL SITES ARE AVERAGING 84% OF NORMAL SNOWPACK ON JANUARY 1 (BY JANUARY 10, THE STATEWIDE AVERAGE WAS 81%). DECEMBER PRECIPITATION WAS 61% OF NORMAL STATE WIDE, AND VARIED FROM 84% OF AVERAGE IN THE NORTH PUGET BASIN TO 37% IN THE OKANOGAN - METHOW BASIN. YEAR-TO-DATE PRECIPITATION VARIES FROM 131% IN THE WALLA WALLA TO 64% IN THE COLVILLE - PEND OREILLE BASINS. DECEMBER TEMPERATURES WERE ABOVE NORMAL AND VARIED FROM 2 DEGREES ABOVE IN THE WALLA WALLA BASIN TO 6 DEGREES ABOVE IN THE OKANOGAN BASIN. JANUARY 1 RESERVOIR STORAGE IS GENERALLY GOOD THROUGHOUT THE STATE, WITH RESERVOIRS IN THE YAKIMA BASIN AT 87% OF AVERAGE AND 47% OF CAPACITY. FORECASTS FOR 1992 RUNOFF VARY FROM 113% OF AVERAGE FOR THE AHTANUM CREEK TO 74% ON MILL CREEK IN THE WALLA WALLA BASIN. DECEMBER STREAMFLOWS VARIED FROM 113% OF NORMAL ON THE YAKIMA RIVER AT CLE ELEM TO 56% ON THE SPOKANE RIVER.

SNOWPACK:

The snowpack started out in November with near normal accumulations in all areas of the state. December started off with good snowfalls then stopped snowing the last ten days. Snowpack varies over the state from 125% of normal in the Chelan Basin to 74% for Ahtanum Creek in the Yakima Basin. Snowpack along the west slopes of the Cascade Mountains includes the Green with 80%, and the Skagit 123%. Snowpack in the Okanogan is at 90%, and the Spokane at 103%. SNOTEL sites in Washington have a snowpack 84% of average for JANUARY 1, state wide. Maximum snow cover is at Paradise on Mount Rainier, with a water content of 29.2 inches. This site would normally have 28.9 inches of water content on January 1.

PRECIPITATION:

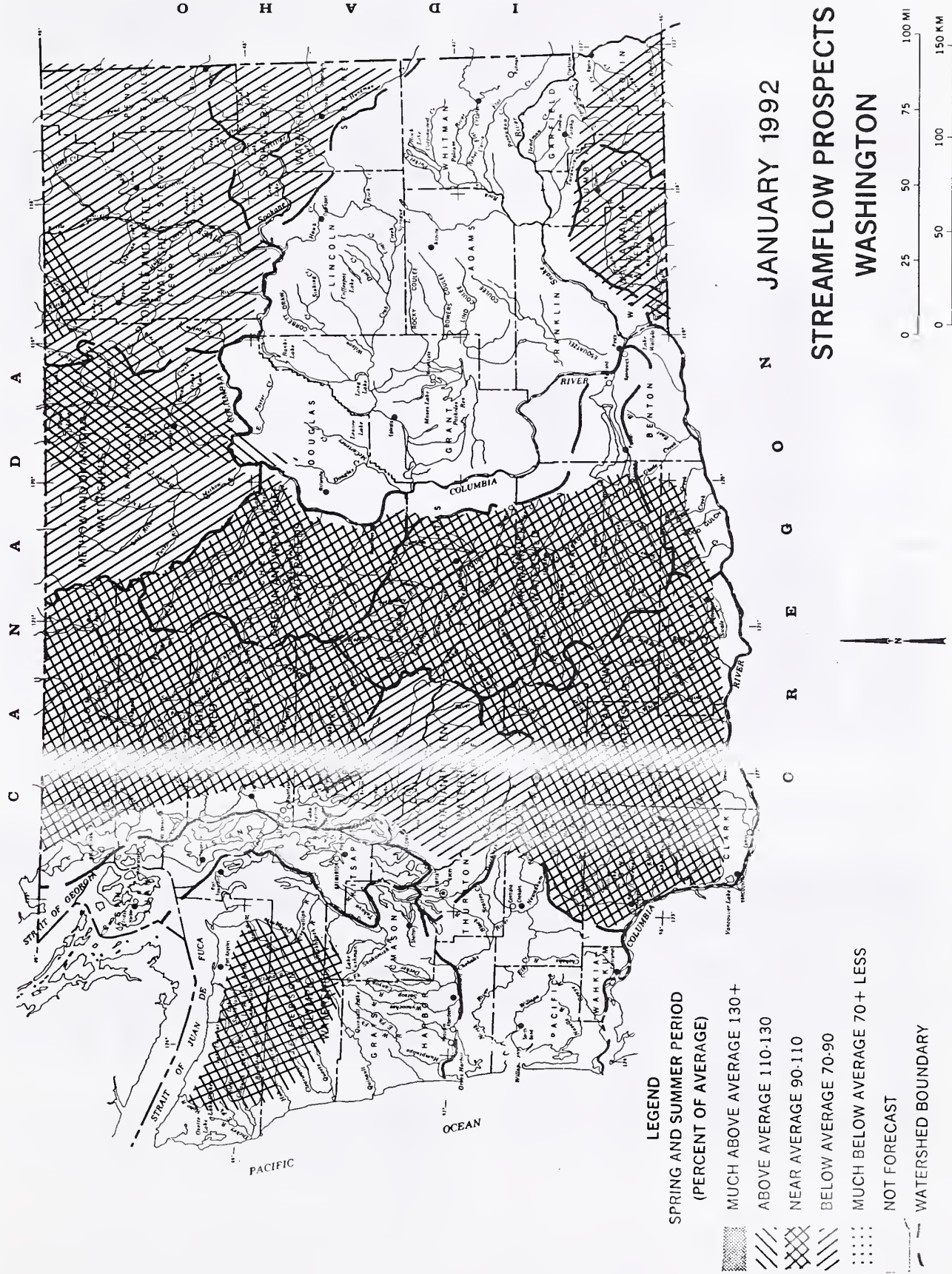
December precipitation from National Weather Service stations was 61% of average statewide. The year-to-date precipitation statewide is 86% and varied from 131% of normal in the Walla Walla Basin to 64% in the Colville-Pend Oreille Basin. December precipitation varied from 80% of average in the North Puget Basin, to 37% in the Okanogan Basin. SNOTEL sites in Washington showed high elevation year-to-date precipitation values to be 83%. Maximum year-to-date precipitation was at the June Lake SNOTEL site near Mt. St. Helens, with 49.8 inches since October 1, 1991; normal for this site would be 65.5 inches.

RESERVOIR:

Reservoir storage in Washington is generally good for January 1. Reservoir storage in the Yakima Basin was 505,400 acre feet, 87% of normal. Storage at other reservoirs include Roosevelt at 102% of average, and the Okanogan reservoirs at 113% of January 1 normal. The power generation reservoirs contain the following: Coeur d'Alene Lake, 74,400 acre feet, or 36% of normal; Chelan Lake, 324,100 acre feet, 86% of average and 48% of capacity, and Ross Lake at 148% of average, and 83% of capacity.

STREAMFLOW:

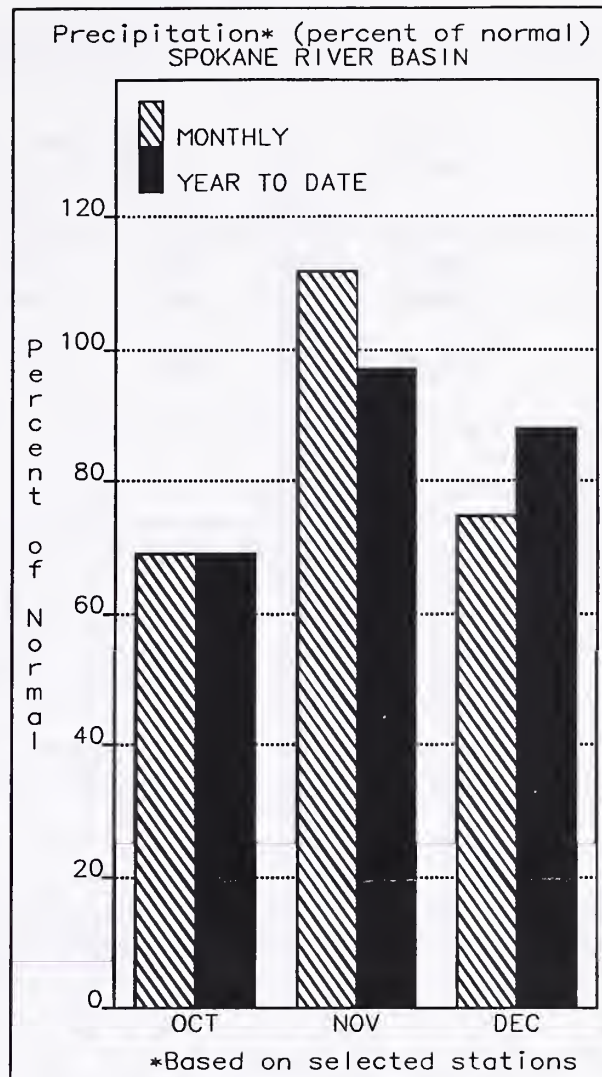
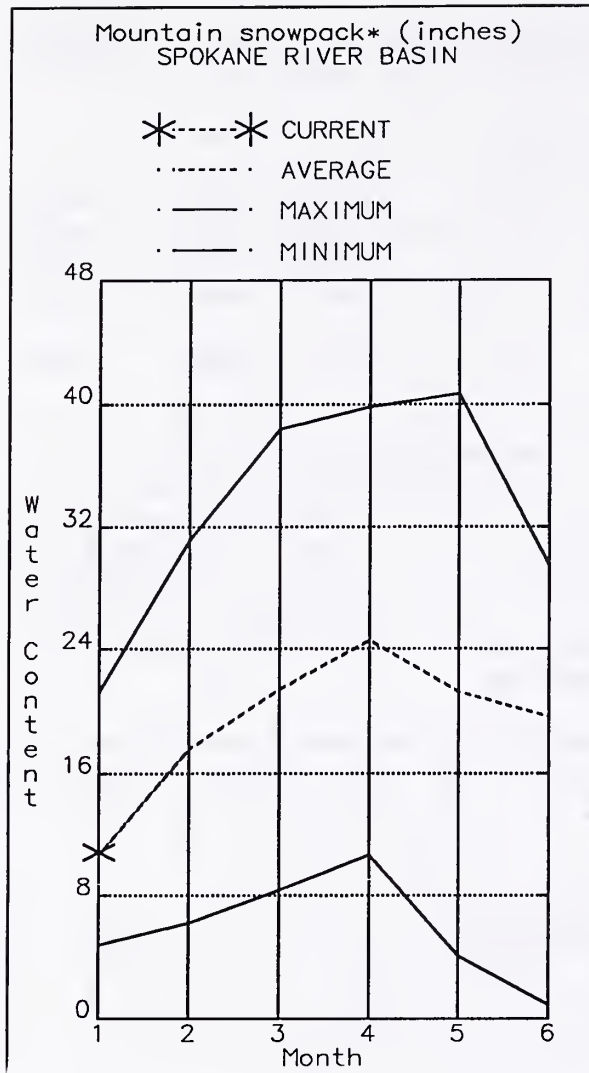
December streamflows were generally below average in Washington, however the Similkameen River and the Yakima River at Cle Elem were the highest in the state, at 100% and 113%. Other streamflows were the following percent of normal: the Cowlitz River, 89%; the Walla Walla River, 95%; the Spokane River, 56%; the Columbia at the Canadian border, 84%. The Wenatchee River at 87% and the Methow with 78%. The Okanogan River was 85%. Forecasts for summer streamflow are for below to near average and vary from 113% of average for the Ahtanum Creek to 74% of normal on Mill Creek in the Walla Walla River Basin. January forecasts for some west side streams include: Cedar River, 85%; Skagit River, 96%; and the Dungeness River, 95%. Some east side streams include the Yakima River at Parker, 84%; the Wenatchee River at Peshastin, 100%; and the Spokane River, 85%.



SOURCE: Data compiled by SCS
Field Personnel

JANUARY 1992

| SNOW COURSE | | ELEVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-90 | SNOW COURSE | | ELEVATION | DATE | SNOW DEPTH | WATER CONTENT | LAST YEAR | AVERAGE 1961-90 |
|----------------------|--|-----------|----------|------------|---------------|-----------|-----------------|------------------------|------|-----------|------|------------|---------------|-----------|-----------------|
| PEND OREILLE RIVER | | | | | | | | YAKIMA RIVER | | | | | | | |
| BENTON MEADOW | | 2370 | 12/30/91 | 2 | .5 | 1.3 | 2.7 | ANTANUM R.S. | 3100 | 1/02/92 | | 9 | 2.0 | 1.3 | 3.5 |
| BENTON SPRING | | 4920 | 12/30/91 | 22 | 7.0 | 5.5 | 8.0 | BLEWETT PASS#2PILLOW | 4270 | 1/01/92 | --- | | 5.75 | 6.4 | 8.3 |
| BUNCHGRASS MEADOWS | | 5000 | 1/01/92 | --- | 13.0E | 14.5 | 14.8 | BUMPING LAKE | 3450 | 12/27/91 | | 8 | 2.5 | 3.0 | 6.0 |
| BUNCHGRASS MOWPILLOW | | 5000 | 1/01/92 | --- | 12.4 | 14.7 | 11.5 | BUMPING LAKE (NEW) | 3400 | 12/27/91 | | 11 | 3.6 | 3.6 | 7.5 |
| HEART LAKE TRAIL | | 4800 | 1/01/92 | --- | 8.8E | 12.9 | -- | BUMPING RIDGE PILLOW | 4600 | 1/01/92 | --- | | 8.25 | 8.6 | 9.6 |
| HOOODOO BASIN | | 6050 | 1/01/92 | --- | 21.5E | 31.9 | 20.4 | CORRAL PASS PILLOW | 6000 | 1/01/92 | --- | | 15.35 | 16.2 | 13.5 |
| HOOODOO CREEK | | 5900 | 1/01/92 | --- | 18.3E | 26.9 | 18.0 | FISH LAKE | 3370 | 12/27/91 | | 42 | 13.4 | 12.0 | 10.7 |
| MELSON CAN. | | 3100 | 12/27/91 | 24 | 6.8 | 7.2 | 7.2 | FISH LAKE PILLOW | 3370 | 1/01/92 | --- | | 12.65 | 13.4 | 12.4 |
| KETTLE RIVER | | | | | | | | GREEN LAKE PILLOW | 6000 | 1/01/92 | --- | | 7.35 | 7.5 | 9.2 |
| BARNES CREEK CAN. | | 5300 | 12/27/91 | 30 | 9.8 | 14.3 | 8.7 | GROUSE CAMP PILLOW | 5380 | 1/01/92 | --- | | 9.35 | 5.0 | 8.9 |
| BIG WHITE MTN CAN. | | 5510 | 12/30/91 | 28 | 8.3 | 10.9 | 7.2 | LAKE CLE ELUM | 2200 | 12/28/91 | | 3 | .7 | 3.1 | 3.9 |
| FARRON CAN. | | 4000 | 1/02/92 | 25 | 5.7 | 5.3 | 9.9 | MORSE LAKE PILLOW | 5400 | 1/01/92 | --- | | 20.45 | 17.3 | 19.1 |
| MONASHEE PASS CAN. | | 4500 | 12/27/91 | 22 | 6.7 | 9.4 | 6.2 | OLALLIE MOWS PILLOW | 3960 | 1/01/92 | --- | | 16.05 | 20.1 | 20.3 |
| SPOKANE RIVER | | | | | | | | SASSE RIDGE PILLOW | 4200 | 1/01/92 | --- | | 14.55 | 10.3 | 12.4 |
| FOURTH OF JULY SUM | | 3200 | 1/02/92 | 5 | 2.0 | 3.0 | 3.4 | STAMPEDE PASS PILLOW | 3860 | 1/01/92 | --- | | 17.15 | 18.5 | 16.7 |
| LOST LAKE | | 6110 | 1/01/92 | --- | 27.9E | 33.7 | 23.6 | TUNNEL AVENUE | 2450 | 12/29/91 | | 8 | 2.2 | 6.3 | 8.1 |
| MOSQUITO RIDGE | | 5200 | 1/01/92 | --- | 16.5E | 17.2 | 16.3 | WHITE PASS ES PILLOW | 4500 | 1/01/92 | --- | | 8.25 | 9.1 | 9.8 |
| MOSQUITO PILLOW | | 5200 | 1/01/92 | --- | 15.7 | 16.4 | 15.7 | ANTANUM CREEK | | | | | | | |
| SUNSET | | 5540 | 1/01/92 | --- | 12.9E | 16.4 | -- | ANTANUM R.S. | 3100 | 1/02/92 | | 9 | 2.0 | 1.3 | 3.5 |
| SUNSET PILLOW | | 5540 | 1/01/92 | --- | 16.8 | 20.9 | 15.8 | GREEN LAKE PILLOW | 6000 | 1/01/92 | --- | | 7.35 | 7.5 | 9.0 |
| NEWMAN LAKE | | | | | | | | MILL CREEK | | | | | | | |
| QUARTZ PEAK PILLOW | | 4700 | 1/01/92 | --- | 5.8 | 7.1 | 8.5 | HIGH RIDGE PILLOW | 4980 | 1/01/92 | --- | | 10.95 | 6.9 | 9.7 |
| RAGGED RIDGE | | 3330 | 1/01/92 | 4 | .5 | -- | 3.8 | TOUCHET #2 PILLOW | 5530 | 1/02/92 | --- | | 14.25 | -- | 17.2 |
| OKANOGAN RIVER | | | | | | | | LEWIS + COULITZ RIVERS | | | | | | | |
| BRENDA MINE CAN. | | 4800 | 12/27/91 | 18 | 4.9 | 6.6 | 6.5 | JUNE LAKE PILLOW | 3200 | 1/01/92 | --- | | 3.75 | 20.1 | 11.5 |
| ENDERBY CAN. | | 6200 | 12/30/91 | 45 | 13.3 | 29.0 | 18.6 | LOVE PINE PILLOW | 3800 | 1/01/92 | --- | | 8.35 | 10.9 | 12.0 |
| GREYBACK RES CAN. | | 5120 | 12/30/91 | 17 | 3.8 | 7.0 | 3.1 | PARADISE PARK PILLOW | 5500 | 1/01/92 | --- | | 29.35 | 33.1 | 23.6 |
| HAMILTON HILL CAN. | | 4890 | 12/31/91 | 22 | 5.8 | 12.3 | 8.4 | PIGTAIL PEAK PILLOW | 5900 | 1/01/92 | --- | | 19.25 | 28.6 | 20.1 |
| HARTS PASS PILLOW | | 6500 | 1/01/92 | --- | 22.25 | 41.6 | 17.9 | POTATO HILL PILLOW | 4500 | 1/01/92 | --- | | 8.45 | 9.5 | 10.5 |
| MCCULLOCH CAN. | | 4200 | 12/31/91 | 14 | 3.0 | 4.6 | 3.2 | SHEEP CANYON PILLOW | 4050 | 1/01/92 | --- | | 9.95 | 19.0 | 15.2 |
| MISSION CREEK CAN. | | 5800 | 1/03/92 | 28 | 8.6 | 13.4 | 8.9 | SPENCER MOW PILLOW | 3400 | 1/01/92 | --- | | 5.05 | 9.4 | 9.4 |
| MONASHEE PASS CAN. | | 4500 | 12/27/91 | 22 | 6.7 | 9.4 | 6.2 | SPIRIT LAKE PILLOW | 3100 | 1/01/92 | --- | | .25 | 3.9 | 1.8 |
| MT. KOBAU CAN. | | 5900 | 12/28/91 | 19 | 4.4 | 3.8 | 6.3 | SURPRISE LKS PILLOW | 4250 | 1/01/92 | --- | | 16.05 | 18.6 | 20.2 |
| SALMON MOWS PILLOW | | 4500 | 1/01/92 | --- | 4.15 | 3.3 | 3.9 | WHITE PASS ES PILLOW | 4500 | 1/01/92 | --- | | 8.25 | 9.1 | 9.8 |
| SILVER STAR MTN CAN. | | 6000 | 12/28/91 | 35 | 11.4 | 18.1 | 13.4 | WHITE RIVER | | | | | | | |
| WHITE ROCKS MTN CAN. | | 6000 | 12/30/91 | 28 | 8.5 | 9.6 | 11.6 | CORRAL PASS | 6000 | 12/31/91 | | 52 | 17.3 | 18.7 | -- |
| METHOW RIVER | | | | | | | | CORRAL PASS PILLOW | 6000 | 1/01/92 | --- | | 15.35 | 16.2 | 13.5 |
| HARTS PASS PILLOW | | 6500 | 1/01/92 | --- | 22.25 | 41.6 | 17.9 | MORSE LAKE PILLOW | 5400 | 1/01/92 | --- | | 20.45 | 17.3 | 19.1 |
| SALMON MOWS PILLOW | | 4500 | 1/01/92 | --- | 4.15 | 3.3 | 3.9 | GREEN RIVER | | | | | | | |
| CHELAN LAKE BASIN | | | | | | | | COUGAR MTN. PILLOW | 3200 | 1/01/92 | --- | | 4.85 | 10.4 | 8.3 |
| LYMAN LAKE PILLOW | | 5900 | 1/01/92 | --- | 28.85 | 52.1 | 25.4 | GRASS MOUNTAIN #2 | 2900 | 12/31/91 | | 0 | .0 | 4.0 | 4.8 |
| MINKERS RIDGE PILLOW | | 6200 | 1/01/92 | --- | 7.95 | 43.9 | -- | LESTER CREEK | 3100 | 12/31/91 | | 18 | 5.2 | 7.8 | 8.0 |
| PARK CK RIDGE PILLOW | | 4600 | 1/01/92 | --- | 23.95 | 28.4 | 18.4 | LYNN LAKE | 4000 | 12/31/91 | | 24 | 8.8 | 10.8 | 7.6 |
| RAINY PASS PILLOW | | 4780 | 1/01/92 | --- | 21.35 | 28.9 | 15.4 | SAWMILL RIDGE | 4700 | 12/31/91 | | 32 | 9.3 | 13.0 | 13.3 |
| ENTIAT RIVER | | | | | | | | STAMPEDE PASS PILLOW | 3860 | 1/01/92 | --- | | 17.15 | 18.5 | 16.7 |
| POPE RIDGE PILLOW | | 3540 | 1/01/92 | --- | 9.75 | 7.5 | 9.1 | TWIN CAMP | 4100 | 12/31/91 | | 32 | 9.8 | 9.8 | 10.0 |
| WENATCHEE RIVER | | | | | | | | SHOQUALMIE RIVER | | | | | | | |
| BERNE-MILL CREEK (d) | | 3170 | 12/30/91 | 32 | 9.1 | -- | 11.2 | OLALLIE MOWS PILLOW | 3960 | 1/01/92 | --- | | 16.05 | 20.1 | 20.3 |
| BLEWETT PASS#2PILLOW | | 4270 | 1/01/92 | --- | 5.75 | 6.4 | 8.3 | SKYKOMISH RIVER | | | | | | | |
| CHIAWUKUM G.S. | | 2500 | 12/30/91 | 12 | 2.8 | 2.8 | 4.8 | STAMPEDE PASS PILLOW | 3860 | 1/01/92 | --- | | 17.15 | 18.5 | 16.7 |
| FISH LAKE PILLOW | | 3370 | 1/01/92 | --- | 12.65 | 13.4 | 12.4 | STEVENS PASS PILLOW | 4070 | 1/01/92 | --- | | 20.65 | 20.9 | 15.3 |
| LYMAN LAKE PILLOW | | 5900 | 1/01/92 | --- | 28.85 | 52.1 | 25.4 | STEVENS PASS SAND SD | 3700 | 12/30/91 | | 42 | 13.6 | 12.6 | 14.6 |
| MERRITT | | 2140 | 12/30/91 | 9 | 2.3 | 4.8 | 7.1 | SKAGIT RIVER | | | | | | | |
| STEVENS PASS PILLOW | | 4070 | 1/01/92 | --- | 20.65 | 20.9 | 15.3 | HARTS PASS PILLOW | 6500 | 1/01/92 | --- | | 22.25 | 41.6 | 17.9 |
| STEVENS PASS SAND SD | | 3700 | 12/30/91 | 42 | 13.6 | 12.6 | 14.6 | KLESILKVA CAN. | 3710 | 1/05/92 | | 13 | 6.7 | -- | -- |
| TROUGH #2 PILLOW | | 5310 | 1/01/92 | --- | 2.65 | 1.7 | 4.9 | LYMAN LAKE PILLOW | 5900 | 1/01/92 | --- | | 28.85 | 52.1 | 25.4 |
| UPPER WHEELER PILLOW | | 4400 | 1/01/92 | --- | 4.55 | 4.4 | 5.9 | RAINY PASS PILLOW | 4780 | 1/01/92 | --- | | 21.35 | 28.9 | 15.4 |
| STEMILT CREEK | | | | | | | | QUILCENE RIVER | | | | | | | |
| UPPER WHEELER PILLOW | | 4400 | 1/01/92 | --- | 4.55 | 4.4 | 5.9 | MOUNT CRAG PILLOW | 4050 | 1/01/92 | --- | | 4.95 | 6.2 | -- |
| COLOCUM CREEK | | | | | | | | | | | | | | | |
| TROUGH #2 PILLOW | | 5310 | 1/01/92 | --- | 2.65 | 1.7 | 4.9 | | | | | | | | |



SPOKANE

The January 1 forecasts for summer runoff within the Spokane River Basin are 85% of normal. The forecast is based on a snowpack that is 103% of average and a water year-to-date precipitation value 88% of normal. Precipitation for December was 75% of average. Temperatures in the basin were 5 degrees above normal during December. Streamflow on the Spokane River was 56% of normal for December. January 1 storage in Coeur d'Alene Lake was 74,400 acre feet, 36% of normal.

SPOKANE RIVER BASIN
Streamflow Forecasts - January 1, 1992

| Forecast Point | Forecast Period | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | 30-Yr Avg. (1000AF) |
|-----------------------------|--------------------|--|----------|---------------------|----------|----------|----------|------------------------|
| | | ===== Chance Of Exceeding * ===== | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | |
| | | (1000AF) | (1000AF) | (1000AF) | (% AVG.) | (1000AF) | (1000AF) | |
| ===== | | ===== | | ===== | | ===== | | |
| SPOKANE nr Post Falls (1,2) | APR-SEP | 810 | 2080 | 2660 | 94 | 3240 | 4510 | 2820 |
| | APR-JUL | 785 | 2010 | 2570 | 94 | 3130 | 4360 | 2723 |
| SPOKANE at Long Lake (2) | APR-JUL | 890 | 2260 | 2870 | 94 | 3480 | 4850 | 3045 |

SPOKANE RIVER BASIN
Reservoir Storage (1000 AF) - End of December

SPOKANE RIVER BASIN
Watershed Snowpack Analysis - January 1, 1992

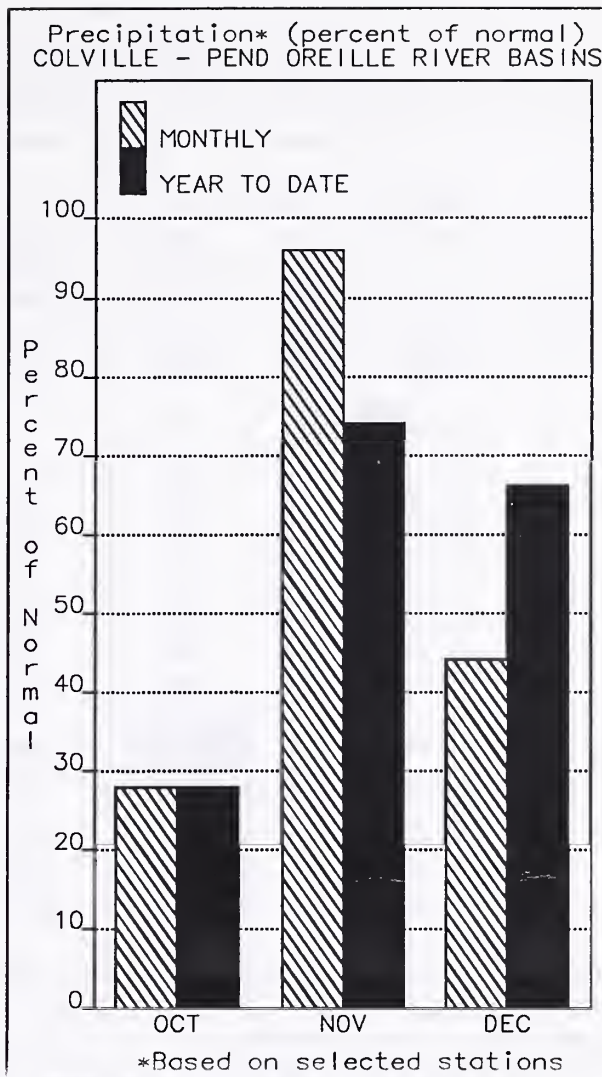
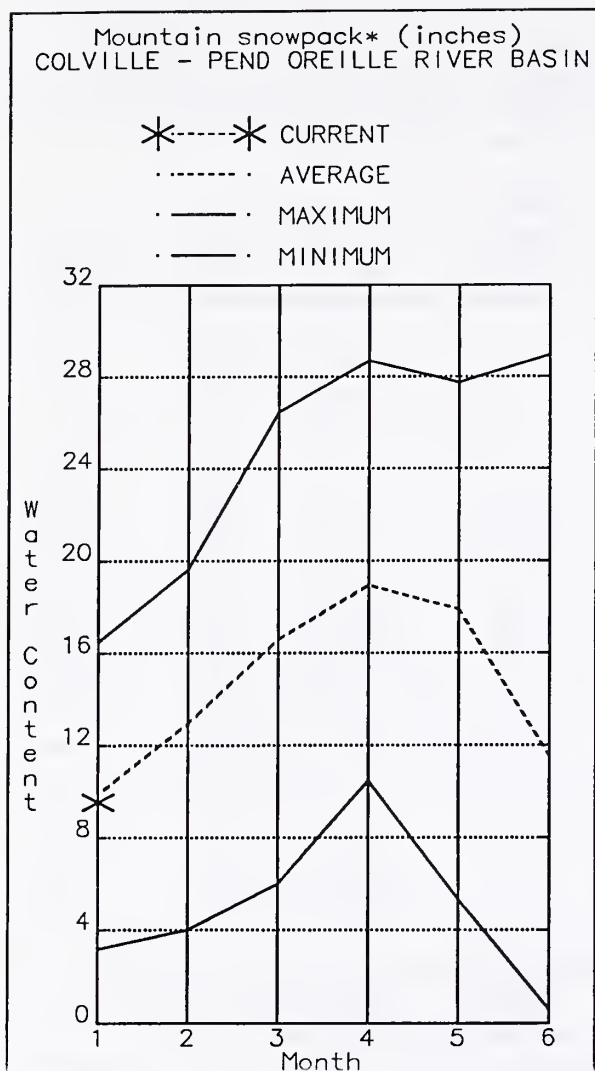
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
|---------------|-----------------|------------------------|-----------|-------|---------------|----------------------|-------------------|---------|
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | | | | |
| COEUR D'ALENE | 291.2 | 74.4 | 167.2 | 207.7 | Spokane River | 6 | 88 | 103 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



COLVILLE - PEND OREILLE RIVER BASINS:

January 1 snow cover is 98% of average on the Pend Oreille and 96% on the Kettle. Snowpack at Bunchgrass Meadow SNOTEL site was 12.4 inches of water, the average January 1 reading is 14.7. Precipitation during December was 33% of average, bringing the water year-to-date to 64% of normal. December streamflow was 65% of normal on the Pend Oreille River, 84% on the Columbia at the International Boundary, and 56% on the Kettle River. The forecast for the Kettle River streamflow is 91% of normal, the Pend Oreille, 108%, and the Colville River, 83% of normal for the summer runoff period. Temperatures were three degrees above normal for December.

COLVILLE - PEND OREILLE RIVER BASINS
Streamflow Forecasts - January 1, 1992

| Forecast Point | Forecast Period | <===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | 30-Yr Avg. (1000AF) |
|-----------------------------------|--------------------|---|----------|---------------------|----------|----------|----------|------------------------|
| | | ===== Chance Of Exceeding * ===== | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | |
| | | (1000AF) | (1000AF) | (1000AF) | (% AVG.) | (1000AF) | (1000AF) | |
| | | | | | | | | |
| PEND OREILLE bl Box Canyon (1,2) | APR-SEP | 7820 | 11300 | 12900 | 88 | 14500 | 18000 | 14590 |
| | APR-JUL | 7140 | 10300 | 11800 | 88 | 13300 | 16500 | 13380 |
| CHAMOKANE CK nr Long Lake | MAY-AUG | 2.4 | 6.5 | 9.3 | 84 | 12.1 | 16.2 | 11.1 |
| COLVILLE at Kettle Falls | APR-SEP | 52 | 91 | 117 | 84 | 143 | 182 | 140 |
| | APR-JUL | 46 | 82 | 106 | 83 | 131 | 167 | 128 |
| | APR-JUN | 41 | 74 | 96 | 81 | 118 | 151 | 118 |
| KETTLE nr Laurier | APR-SEP | 990 | 1500 | 1840 | 96 | 2180 | 2690 | 1907 |
| | APR-JUL | 945 | 1420 | 1750 | 97 | 2080 | 2560 | 1807 |
| | APR-JUN | 845 | 1280 | 1570 | 97 | 1860 | 2290 | 1622 |
| COLUMBIA at Birchbank (1,2) | APR-SEP | 30200 | 37400 | 40600 | 93 | 43800 | 51000 | 43810 |
| | APR-JUL | 24300 | 30000 | 32600 | 93 | 35200 | 40900 | 35140 |
| COLUMBIA at Grand Coulee Dm (1,2) | APR-SEP | 41100 | 53600 | 59300 | 89 | 65000 | 77500 | 66460 |
| | APR-JUL | 34700 | 45100 | 49900 | 90 | 54700 | 65100 | 55730 |
| | APR-JUN | 27000 | 35200 | 38900 | 90 | 42600 | 50800 | 43420 |

COLVILLE - PEND OREILLE RIVER BASINS
Reservoir Storage (1000 AF) - End of December

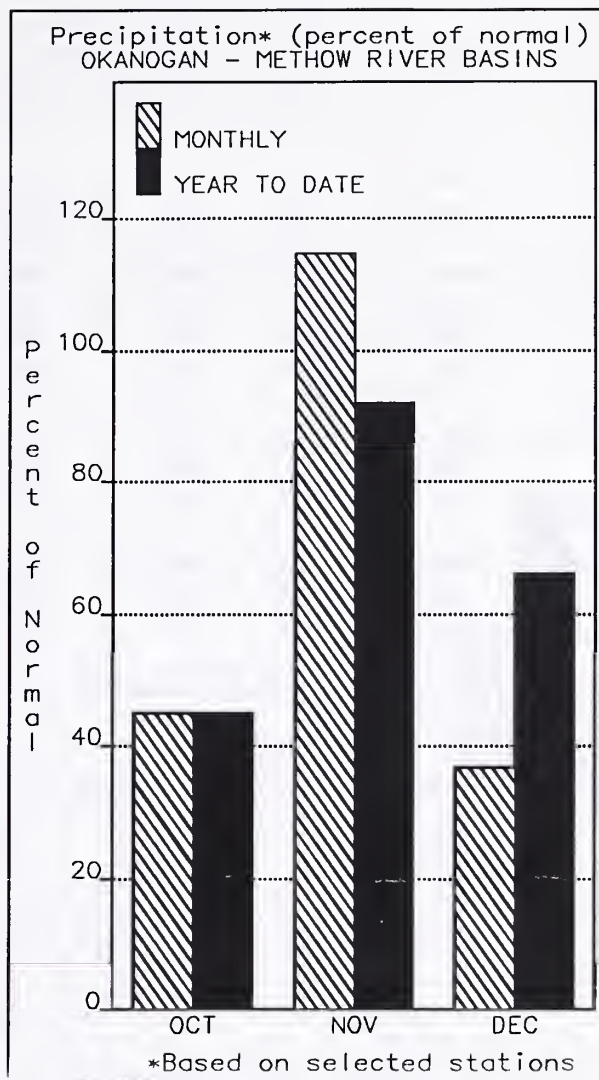
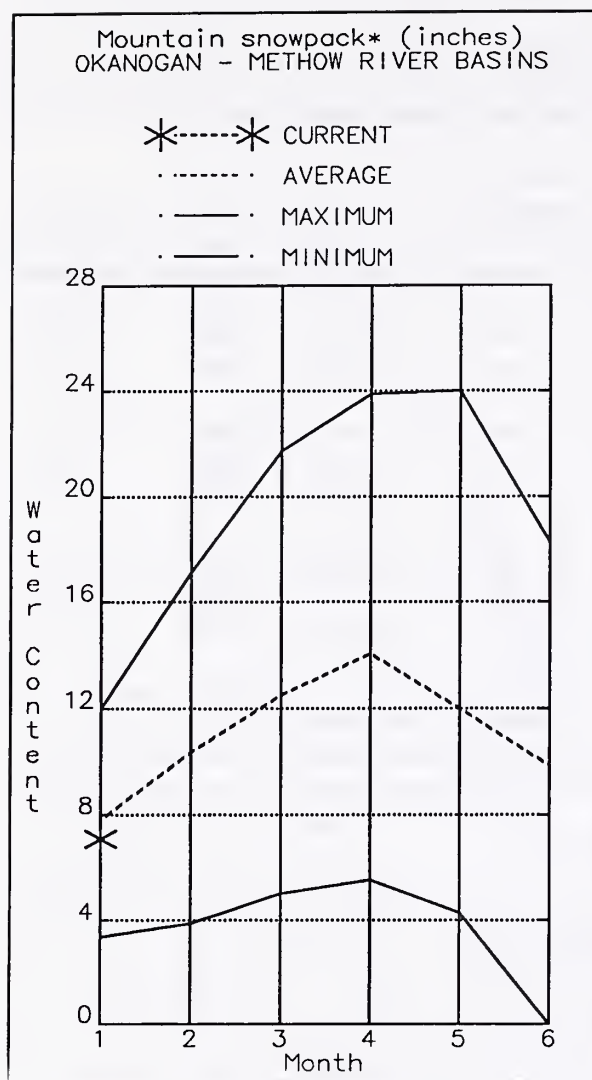
COLVILLE - PEND OREILLE RIVER BASINS
Watershed Snowpack Analysis - January 1, 1992

| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
|-----------|-----------------|------------------------|-----------|--------|----------------|----------------------|-------------------|---------|
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | | | | |
| ROOSEVELT | 5232.0 | 4629.4 | 4258.2 | 4547.9 | Colville River | 0 | 0 | 0 |
| | | | | | Kettle River | 4 | 76 | 95 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.



OKANOGAN - METHOW RIVER BASINS:

January 1 snow cover was 90% of average on the Okanogan, and 121% for the Methow Basin. December precipitation in the Okanogan-Methow was 37% of normal, with water year-to-date at 66% of average. December streamflow on the Methow River was 130% of normal, 176% on the Okanogan River, and 264% on the Similkameen. Snow water content at the Harts Pass SNOTEL, elevation 6500 feet, was 22.2 inches. Summer runoff forecast for the Okanogan River is 157% of normal; the Similkameen River, 161%, the highest in the state; and the Methow River, 120% of normal. Temperatures were six degrees above normal for the month. Storage in the Conconully Reservoirs is 15,200 acre feet, which is 65% of capacity and 113% of January 1 average.

OKANOGAN - METHOW RIVER BASINS
Streamflow Forecasts - January 1, 1992

| | | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | | |
|--------------------------------|-----------------|--|----------|---------------------|----------|----------|----------|------------|----------|
| Forecast Point | Forecast Period | ===== Chance Of Exceeding * ===== | | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | 30-Yr Avg. | |
| | | (1000AF) | (1000AF) | (1000AF) | (% AVG.) | (1000AF) | (1000AF) | | (1000AF) |
| ===== | | ===== | | ===== | | ===== | | | |
| SIMILKAMEEN nr Nighthawk (1) | APR-SEP | 775 | 1170 | 1350 | 94 | 1530 | 1920 | 1432 | |
| | APR-JUL | 740 | 1100 | 1260 | 95 | 1420 | 1780 | 1333 | |
| | APR-JUN | 670 | 940 | 1060 | 94 | 1180 | 1450 | 1129 | |
| OKANOGAN RIVER nr Tonasket (1) | APR-SEP | 755 | 1270 | 1500 | 90 | 1730 | 2240 | 1661 | |
| | APR-JUL | 700 | 1150 | 1350 | 90 | 1550 | 2000 | 1501 | |
| | APR-JUN | 635 | 975 | 1130 | 90 | 1280 | 1630 | 1256 | |
| METHOW RIVER nr Pateros (1) | APR-SEP | 270 | 670 | 850 | 87 | 1030 | 1430 | 980 | |
| | APR-JUL | 245 | 620 | 790 | 87 | 960 | 1330 | 907 | |
| | APR-JUN | 215 | 530 | 670 | 87 | 810 | 1120 | 770 | |

OKANOGAN - METHOW RIVER BASINS
Reservoir Storage (1000 AF) - End of December

OKANOGAN - METHOW RIVER BASINS
Watershed Snowpack Analysis - January 1, 1992

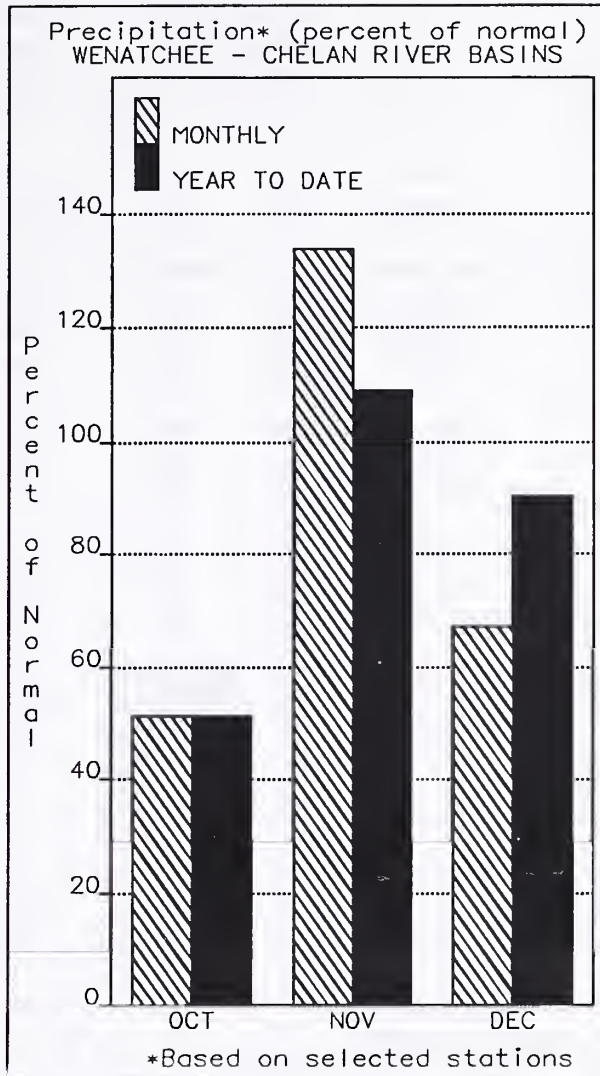
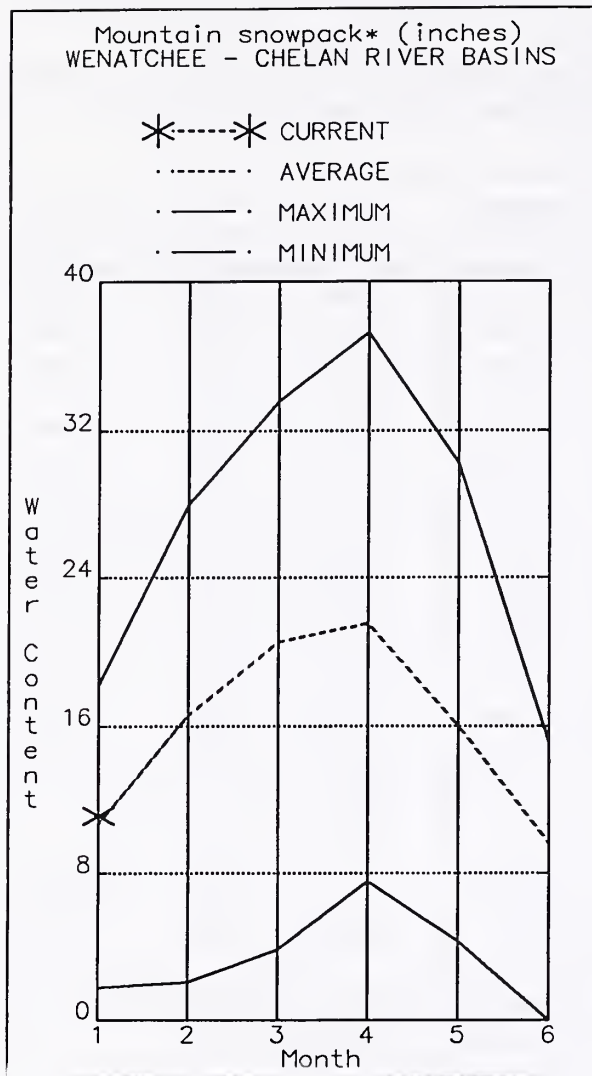
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
|--------------------------|-----------------|------------------------|-----------|-----|----------------|----------------------|-------------------|---------|
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| CONCONULLY LAKE (SALMON) | 10.5 | 8.2 | 9.7 | 7.5 | Okanogan River | 13 | 62 | 90 |
| CONCONULLY RESERVOIR | 13.0 | 7.0 | 8.1 | 5.9 | Methow River | 2 | 59 | 121 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



WENATCHEE - CHELAN RIVER BASINS:

January 1 snowpack in the Wenatchee Basin is 95% and the Chelan Basin 125%. Snowpack continues low along Colockum Ridge for the fourth consecutive year, with Stemilt Creek at 76%. Reservoir storage in Lake Chelan is 324,100 acre feet or 86% of January 1 average and 48% of capacity. Lyman Lake SNOTEL had the most snow water with 28.8 inches of water, this site would normally have 25.4 inches. Runoff for the Entiat River is forecast to be 95% of normal for the summer. Summer forecasts for the Chelan River are for 118%, Wenatchee River's runoff 109%, and 85% on the Squilchuck-Stemilt. Streamflow for December on the Chelan River was 125% of average and the Wenatchee River was 124% of normal. Precipitation during December was 67% of normal in the basin and 90% for the year-to-date.

WENATCHEE - CHELAN RIVER BASINS
Streamflow Forecasts - January 1, 1992

| Forecast Point | Forecast Period | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | 30-Yr Avg. (1000AF) |
|----------------------------------|--------------------|--|-----------------|--|-----|-----------------|-----------------|------------------------|
| | | ===== Chance Of Exceeding * ===== | | | | | | |
| | | 90% (1000AF) | 70% (1000AF) | 50% (Most Probable) (1000AF) (% AVG.) | | 30% (1000AF) | 10% (1000AF) | |
| ===== | | | | | | | | |
| CHELAN RIVER at Chelan (1) | APR-SEP | 720 | 1020 | 1160 | 98 | 1300 | 1600 | 1182 |
| | APR-JUL | 630 | 900 | 1020 | 98 | 1140 | 1410 | 1040 |
| | APR-JUN | 495 | 705 | 800 | 98 | 895 | 1100 | 815 |
| STEHEKIN R. at Stehekin | APR-SEP | 680 | 805 | 890 | 105 | 975 | 1100 | 844 |
| | APR-JUL | 575 | 680 | 750 | 105 | 820 | 925 | 714 |
| | APR-JUN | 435 | 515 | 570 | 105 | 625 | 705 | 541 |
| ENTIAT RIVER nr Ardenvoir | APR-SEP | 176 | 215 | 245 | 105 | 275 | 315 | 233 |
| | APR-JUL | 164 | 205 | 230 | 104 | 255 | 295 | 221 |
| | APR-JUN | 129 | 159 | 180 | 105 | 200 | 230 | 171 |
| WENATCHEE R. at Peshastin | APR-SEP | 1080 | 1440 | 1680 | 100 | 1920 | 2280 | 1678 |
| | APR-JUL | 980 | 1300 | 1520 | 100 | 1740 | 2060 | 1516 |
| | APR-JUN | 785 | 1040 | 1220 | 100 | 1400 | 1650 | 1216 |
| STEMILT nr Wenatchee (miners in) | MAY-SEP | 89 | 118 | 138 | 100 | 158 | 187 | 138 |
| ICICLE CREEK nr Leavenworth | APR-SEP | 230 | 305 | 360 | 97 | 415 | 490 | 370 |
| | APR-JUL | 210 | 280 | 330 | 97 | 380 | 450 | 340 |
| | APR-JUN | 164 | 220 | 260 | 96 | 300 | 355 | 270 |

WENATCHEE - CHELAN RIVER BASINS
Reservoir Storage (1000 AF) - End of December

WENATCHEE - CHELAN RIVER BASINS
Watershed Snowpack Analysis - January 1, 1992

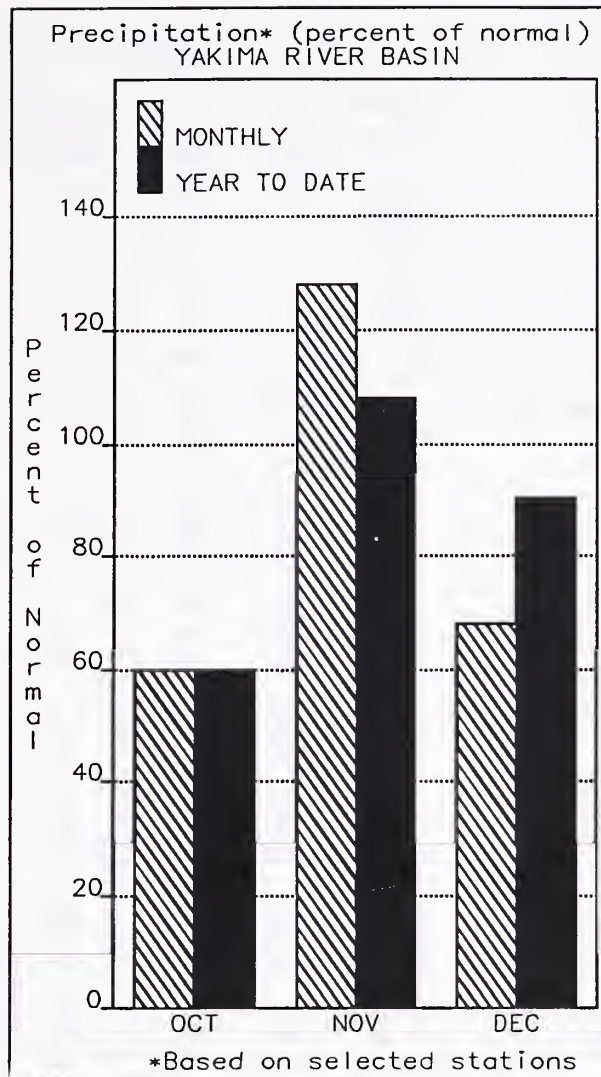
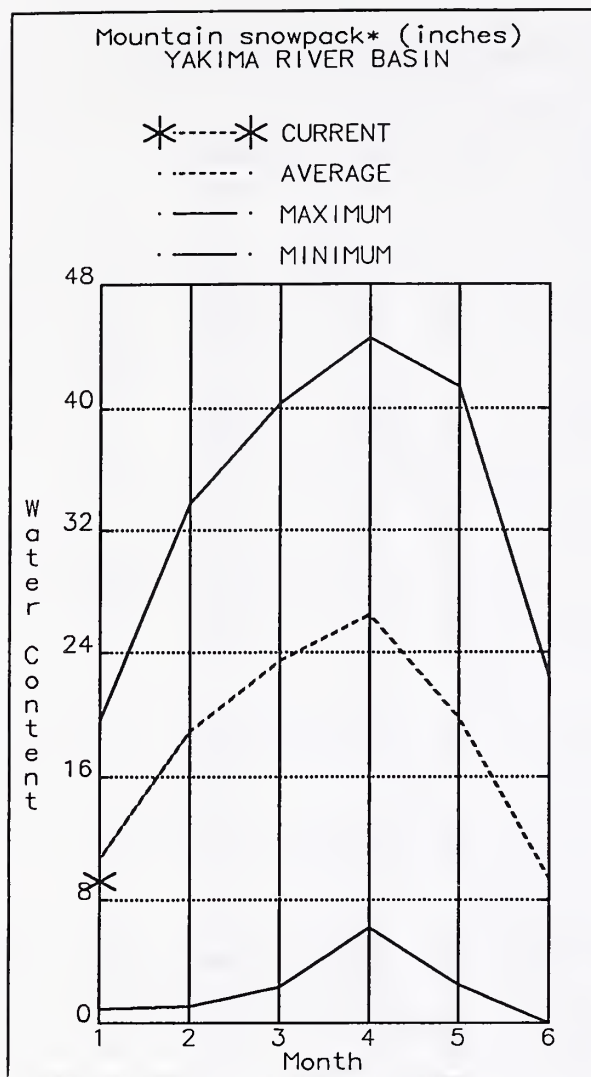
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
|-------------|-----------------|------------------------|-----------|-------|-------------------|----------------------|-------------------|---------|
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| CHELAN LAKE | 676.1 | 324.1 | 591.2 | 378.7 | Chelan Lake Basin | 3 | 68 | 125 |
| | | | | | Entiat River | 1 | 129 | 107 |
| | | | | | Wenatchee River | 8 | 78 | 96 |
| | | | | | Squilchuck Creek | 0 | 0 | 0 |
| | | | | | Stemilt Creek | 1 | 102 | 76 |
| | | | | | Colockum Creek | 1 | 153 | 53 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



YAKIMA RIVER BASIN:

December precipitation was 68% of normal and 90% for the water year-to-date. The outlook for irrigation water for the summer is good with January 1 reservoir storage for the five major reservoirs at 505,400 acre feet, 86% of average. January 1 snowpack is 86% based upon 16 snow courses and SNOTEL readings. January 1 summer streamflow forecasts for the Yakima Basin vary throughout the basin as follows: the Yakima River at Cle Elum, 78%; Naches River, 80%; the Yakima River at Parker, 78%; Ahtanum Creek, 77%, and Tieton River 79%. December streamflows were near normal with the Yakima River at Parker 97% of normal, 119% on the Yakima near Cle Elum, and 104% on the Naches River. Temperatures were five degrees above average for December. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U. S. Bureau of Reclamation's forecast for the total water supply available which includes adjustments for reservoir operation and irrigation return flow.

YAKIMA RIVER BASIN
Streamflow Forecasts - January 1, 1992

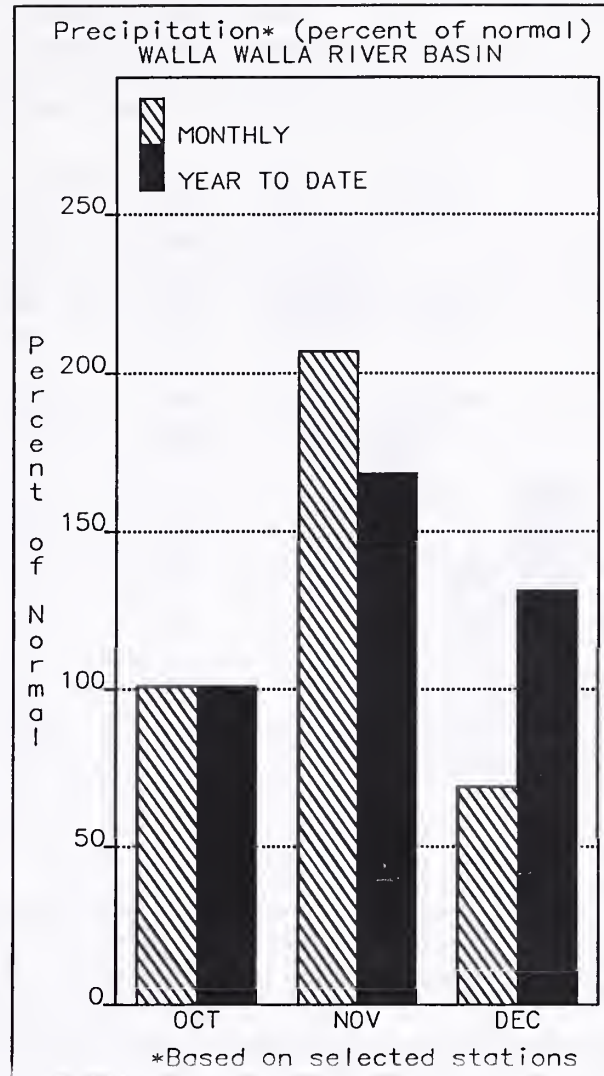
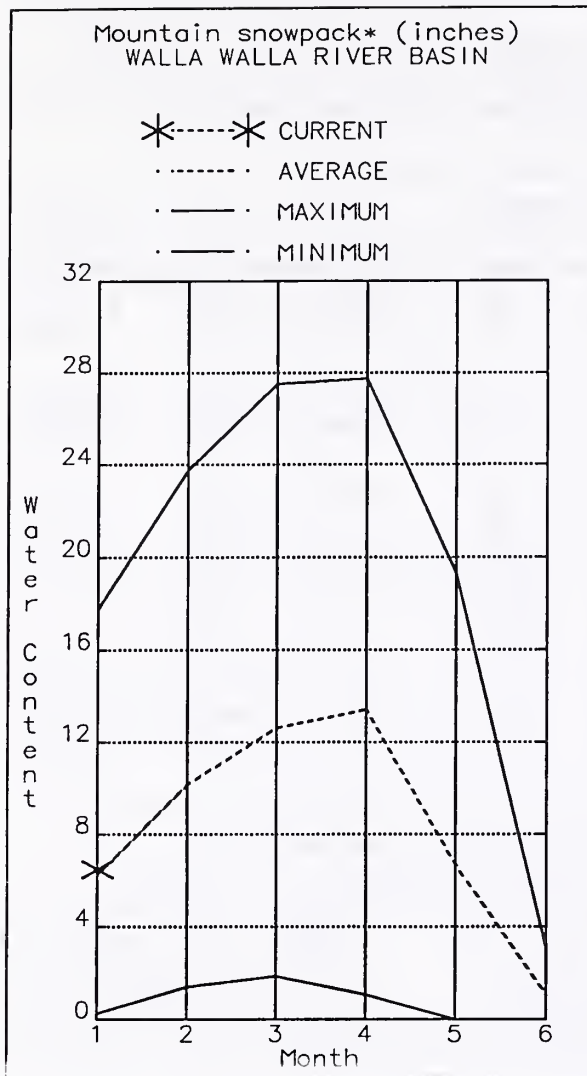
| Forecast Point | Forecast Period | <===== Drier ===== Future Conditions ===== Wetter =====> | | | | | | 30-Yr Avg. (1000AF) |
|------------------------------|-----------------|--|-----------------|---------------------------------|----------|-----------------|-----------------|------------------------|
| | | Chance Of Exceeding * | | | | | | |
| | | 90% (1000AF) | 70% (1000AF) | 50% (Most Probable) (1000AF) | (% AVG.) | 30% (1000AF) | 10% (1000AF) | |
| YAKIMA RIVER at Martin (1) | APR-SEP | 92 | 111 | 120 | 88 | 129 | 148 | 136 |
| | APR-JUL | 84 | 102 | 110 | 87 | 118 | 136 | 126 |
| | APR-JUN | 76 | 92 | 99 | 88 | 106 | 122 | 112 |
| YAKIMA RIVER at Cle Elum (2) | APR-SEP | 725 | 815 | 875 | 92 | 935 | 1030 | 951 |
| | APR-JUL | 645 | 725 | 780 | 92 | 835 | 915 | 846 |
| | APR-JUN | 560 | 630 | 675 | 92 | 720 | 790 | 735 |
| YAKIMA RIVER nr Parker (2) | APR-SEP | 1190 | 1560 | 1810 | 87 | 2060 | 2430 | 2075 |
| | APR-JUL | 1070 | 1400 | 1620 | 87 | 1840 | 2170 | 1862 |
| | APR-JUN | 940 | 1230 | 1430 | 87 | 1630 | 1920 | 1643 |
| KACHESS RIVER nr Easton (1) | APR-SEP | 95 | 117 | 127 | 95 | 137 | 160 | 133 |
| | APR-JUL | 81 | 100 | 109 | 96 | 118 | 137 | 114 |
| | APR-JUN | 72 | 89 | 97 | 95 | 105 | 122 | 102 |
| CLE ELUM RIVER nr Roslyn (1) | APR-SEP | 385 | 455 | 485 | 106 | 515 | 585 | 459 |
| | APR-JUL | 350 | 410 | 440 | 106 | 470 | 530 | 417 |
| | APR-JUN | 295 | 345 | 370 | 105 | 395 | 445 | 353 |
| BUMPING RIVER nr Nile (1) | APR-SEP | 99 | 136 | 153 | 110 | 170 | 205 | 139 |
| | APR-JUL | 91 | 125 | 140 | 109 | 155 | 189 | 128 |
| | APR-JUN | 74 | 102 | 115 | 108 | 128 | 156 | 106 |
| AMERICAN RIVER nr Nile | APR-SEP | 81 | 102 | 117 | 97 | 132 | 153 | 121 |
| | APR-JUL | 75 | 95 | 108 | 96 | 122 | 141 | 112 |
| | APR-JUN | 63 | 80 | 91 | 97 | 102 | 119 | 94 |
| TIETON RIVER at Tieton (1) | APR-SEP | 121 | 186 | 215 | 88 | 245 | 310 | 244 |
| | APR-JUL | 108 | 163 | 188 | 90 | 215 | 270 | 208 |
| | APR-JUN | 86 | 131 | 151 | 90 | 171 | 215 | 168 |
| NACHES RIVER nr Naches (2) | APR-SEP | 505 | 665 | 775 | 90 | 885 | 1050 | 860 |
| | APR-JUL | 460 | 605 | 705 | 91 | 805 | 950 | 779 |
| | APR-JUN | 395 | 520 | 605 | 91 | 690 | 815 | 667 |
| AHTANUM CREEK nr Tappico (2) | APR-SEP | 32 | 45 | 53 | 113 | 62 | 74 | 47 |
| | APR-JUL | 29 | 40 | 48 | 112 | 56 | 67 | 43 |
| | APR-JUN | 25 | 34 | 41 | 111 | 48 | 58 | 37 |

| YAKIMA RIVER BASIN Reservoir Storage (1000 AF) - End of December | | | | | YAKIMA RIVER BASIN Watershed Snowpack Analysis - January 1, 1992 | | | |
|---|-----------------|------------------------|-----------|-------|---|----------------------|-------------------|---------|
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| KEEACHELUS | 157.8 | 80.1 | 109.2 | 83.0 | Yakima River | 17 | 98 | 87 |
| KACHESS | 239.0 | 129.5 | 178.8 | 159.1 | Ahtanum Creek | 2 | 106 | 74 |
| CLE ELUM | 436.9 | 224.9 | 326.9 | 230.2 | | | | |
| BUMPING LAKE | 33.7 | 6.6 | 11.1 | 6.3 | | | | |
| RIMROCK | 198.0 | 64.3 | 121.1 | 102.1 | | | | |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

- (1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
 (2) - The value is natural flow - actual flow may be affected by upstream water management.



WALLA WALLA RIVER BASIN:

December streamflow was 89% of normal on the Walla Walla River, 49% for the Snake River, and 68% on the Grande Ronde River near Troy. January 1 snowpack is at 112%. December precipitation was 69% of average, bringing the water year-to-date precipitation to 131% of normal. The forecast is for 100% of average streamflow in the Walla Walla River for the coming summer, the Grande Ronde, 96%; Snake River, 95%, and 95% for Mill Creek. Temperatures were two degrees above average for December.

WALLA WALLA RIVER BASIN
Streamflow Forecasts - January 1, 1992

| | | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | |
|------------------------------------|-----------------|--|----------|---------------------|-----|----------|----------|------------------------|
| Forecast Point | Forecast Period | Chance Of Exceeding * | | | | | | 30-Yr Avg. (1000AF) |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | |
| | | (1000AF) | (1000AF) | (1000AF) (% AVG.) | | (1000AF) | (1000AF) | |
| GRANDE RONDE at Troy (1) | MAR-JUL | 555 | 1070 | 1300 | 86 | 1530 | 2040 | 1512 |
| | APR-SEP | 505 | 970 | 1180 | 86 | 1390 | 1850 | 1369 |
| SNAKE bl Lower Granite Dam (1,2) | APR-JUL | 6930 | 14400 | 17800 | 78 | 21200 | 28700 | 22760 |
| | APR-SEP | 7780 | 16200 | 20000 | 78 | 23800 | 32200 | 25578 |
| MILL CREEK at Walla Walla | APR-SEP | 4.9 | 10.7 | 14.7 | 83 | 18.7 | 25 | 17.7 |
| | APR-JUL | 4.9 | 10.7 | 14.7 | 84 | 18.7 | 25 | 17.6 |
| | APR-JUN | 4.7 | 10.5 | 14.4 | 83 | 18.3 | 24 | 17.3 |
| SF WALLA WALLA nr Milton Freewater | APR-JUL | 44 | 50 | 55 | 100 | 60 | 66 | 55 |
| COLUMBIA R. at The Dalles (2) | APR-SEP | 83500 | 85500 | 86500 | 85 | 87500 | 89500 | 101800 |
| | APR-JUL | 49000 | 64000 | 74100 | 85 | 84200 | 99200 | 87100 |
| | APR-JUN | 39700 | 51800 | 60000 | 85 | 68200 | 80300 | 70470 |

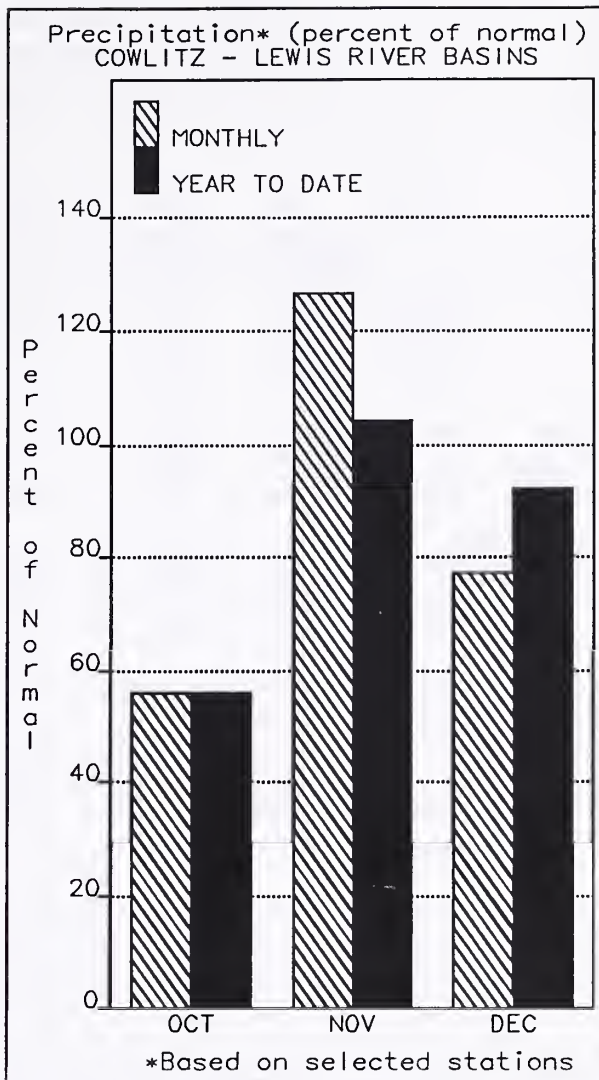
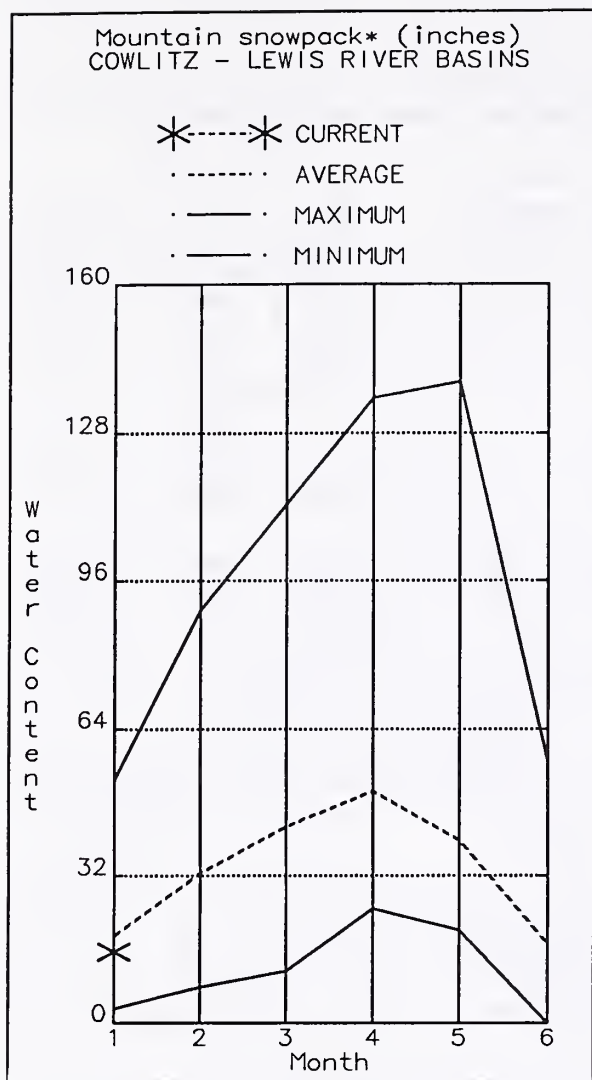
| WALLA WALLA RIVER BASIN Reservoir Storage (1000 AF) - End of December | | | | | WALLA WALLA RIVER BASIN Watershed Snowpack Analysis - January 1, 1992 | | | |
|--|-----------------|------------------------|-----------|-----|--|----------------------|-------------------|---------|
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | | | | |
| | | | | | Mill Creek | 1 | 158 | 112 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



COWLITZ - LEWIS RIVER BASINS:

December precipitation was 77% of normal, bringing the water year-to-date precipitation to 92% of average. January 1 snow cover for the Cowlitz-Lewis River Basin is 81%. The Paradise Park SNOTEL contained the maximum water content for the basin with 29.3 inches of water, normal January 1 water content is 28.9 inches. Forecasts for summer runoff in the Lewis River are 85%, and for the Cowlitz River, 102%. December streamflow on the Cowlitz River was 139% of average, and 143% on the Lewis River. Temperatures were two degrees above normal for December.

COWLITZ - LEWIS RIVER BASINS
Streamflow Forecasts - January 1, 1992

| | | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | | |
|--------------------------------|-----------------|--|----------|---------------------|----------|----------|----------|------------|----------|
| Forecast Point | Forecast Period | ===== Chance Of Exceeding * ===== | | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | 30-Yr Avg. | |
| | | (1000AF) | (1000AF) | (1000AF) | (% AVG.) | (1000AF) | (1000AF) | | (1000AF) |
| | | | | | | | | | |
| LEWIS RIVER at Ariel (2) | APR-SEP | 640 | 950 | 1160 | 93 | 1370 | 1680 | 1244 | |
| | APR-JUL | 560 | 825 | 1010 | 93 | 1190 | 1460 | 1084 | |
| | APR-JUN | 520 | 760 | 920 | 96 | 1080 | 1320 | 958 | |
| COWLITZ R. bl Mayfield Dam (2) | APR-SEP | 960 | 1500 | 1870 | 92 | 2240 | 2780 | 2036 | |
| | APR-JUL | 845 | 1320 | 1640 | 92 | 1960 | 2440 | 1782 | |
| | APR-JUN | 770 | 1170 | 1450 | 95 | 1730 | 2130 | 1524 | |
| COWLITZ R. at Castle Rock (2) | APR-SEP | 1860 | 2260 | 2530 | 94 | 2800 | 3200 | 2687 | |
| | APR-JUL | 1620 | 1960 | 2200 | 94 | 2440 | 2780 | 2343 | |
| | APR-JUN | 1410 | 1710 | 1910 | 95 | 2110 | 2410 | 2015 | |

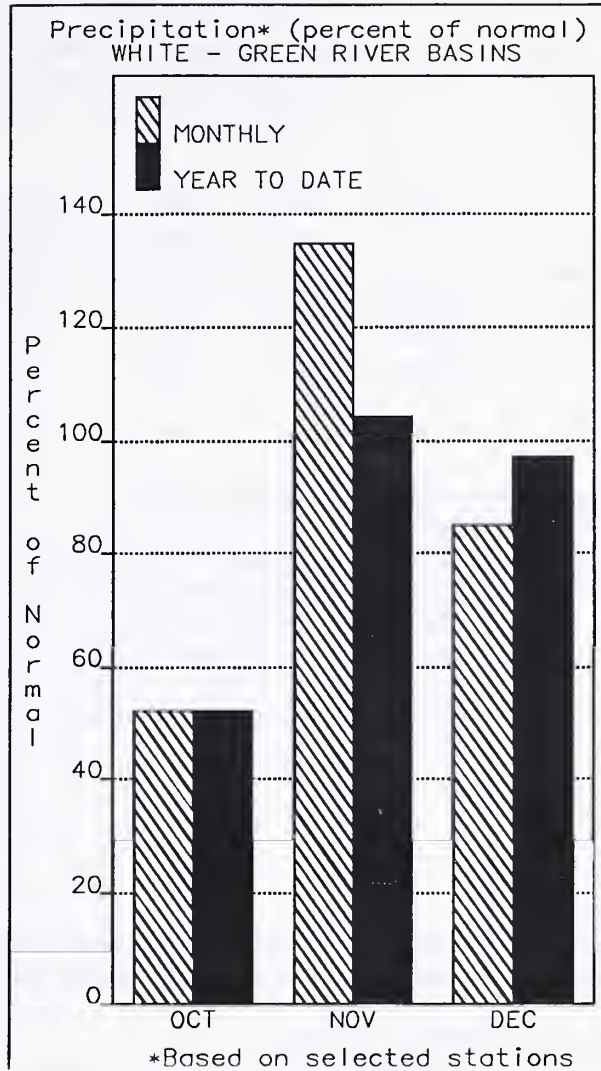
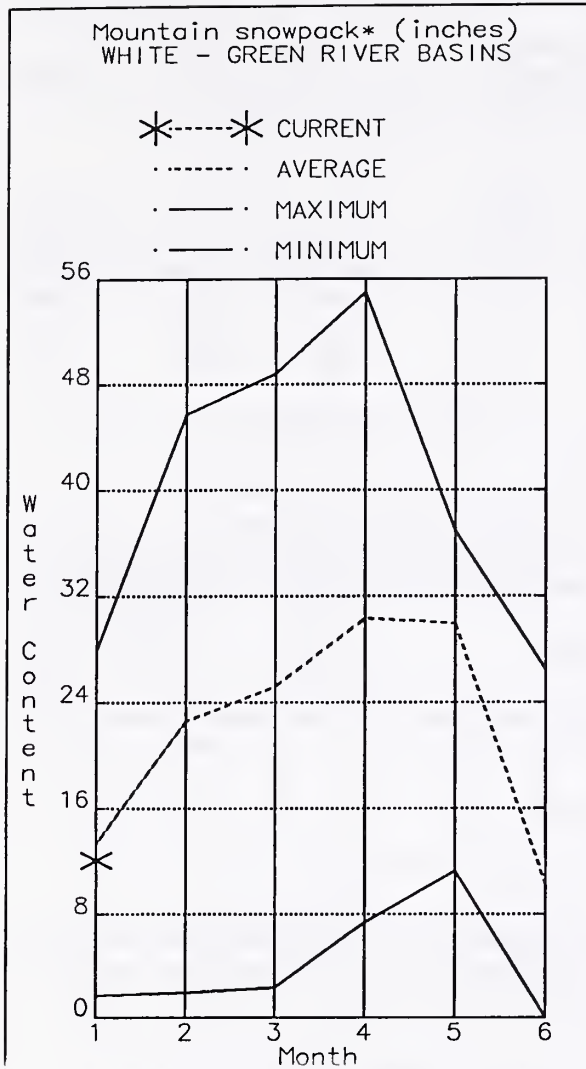
| COWLITZ - LEWIS RIVER BASINS Reservoir Storage (1000 AF) - End of December | | | | | COWLITZ - LEWIS RIVER BASINS Watershed Snowpack Analysis - January 1, 1992 | | | |
|---|-----------------|------------------------|-----------|-----|---|----------------------|-------------------|---------|
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | Cowlitz River | 6 | 73 | 93 |
| | | | | | Lewis River | 4 | 56 | 62 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



WHITE - GREEN RIVER BASINS:

January 1 snowpack was 101% of normal on the White River and 80% in the Green Basin. Water content on January 1 at the Stampede Pass SNOTEL, at an elevation of 3860 feet, was 17.1 inches, this site has a January 1 average of 16.7 inches. December precipitation was 85% of normal, bringing the water year-to-date to 97% of average. Summer runoff is forecasted to be 89% on the Green River and on the Cedar River. Temperatures were five degrees above average for December.

WHITE - GREEN RIVER BASINS
Streamflow Forecasts - January 1, 1992

| | | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | | | | | |
|----------------------------------|--------------------|--|-----|-----------------|-----|--|-----|-----------------|--|-----------------|-----|------------------------|
| Forecast Point | Forecast Period | Chance Of Exceeding * | | | | | | | | | | |
| | | 90% (1000AF) | | 70% (1000AF) | | 50% (Most Probable) (1000AF) (% AVG.) | | 30% (1000AF) | | 10% (1000AF) | | 30-Yr Avg. (1000AF) |
| | | | | | | | | | | | | |
| GREEN R bl Howard Hanson Dam (2) | | APR-SEP | 154 | 215 | 255 | 88 | 295 | 355 | | | 291 | |
| | | APR-JUL | 139 | 193 | 230 | 88 | 265 | 320 | | | 261 | |
| | | APR-JUN | 128 | 177 | 210 | 89 | 245 | 290 | | | 236 | |
| CEDAR RIVER nr Cedar Falls | | APR-SEP | 47 | 66 | 79 | 85 | 92 | 111 | | | 93 | |

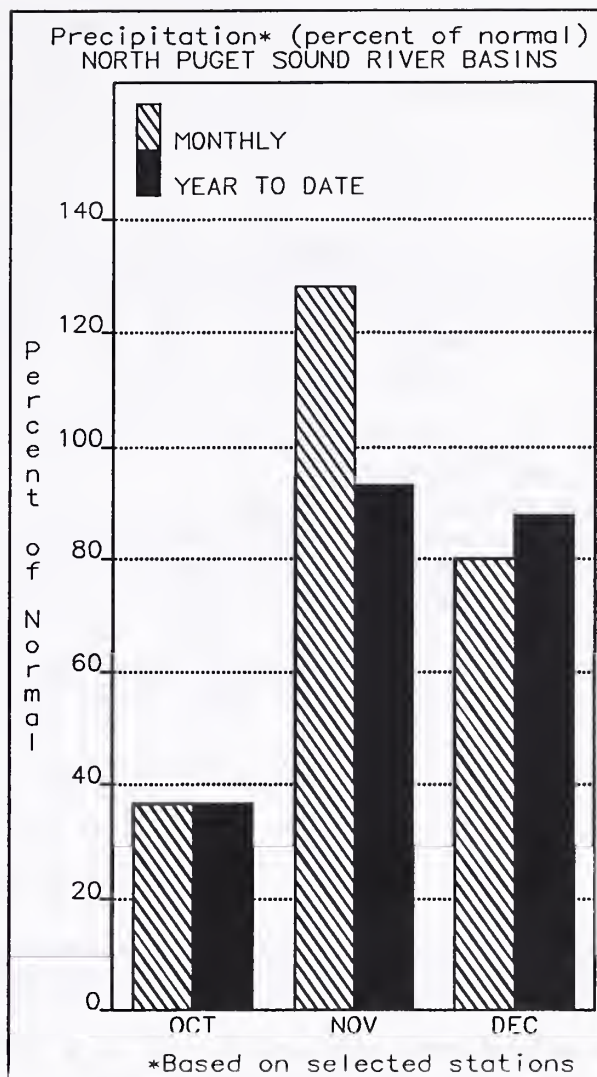
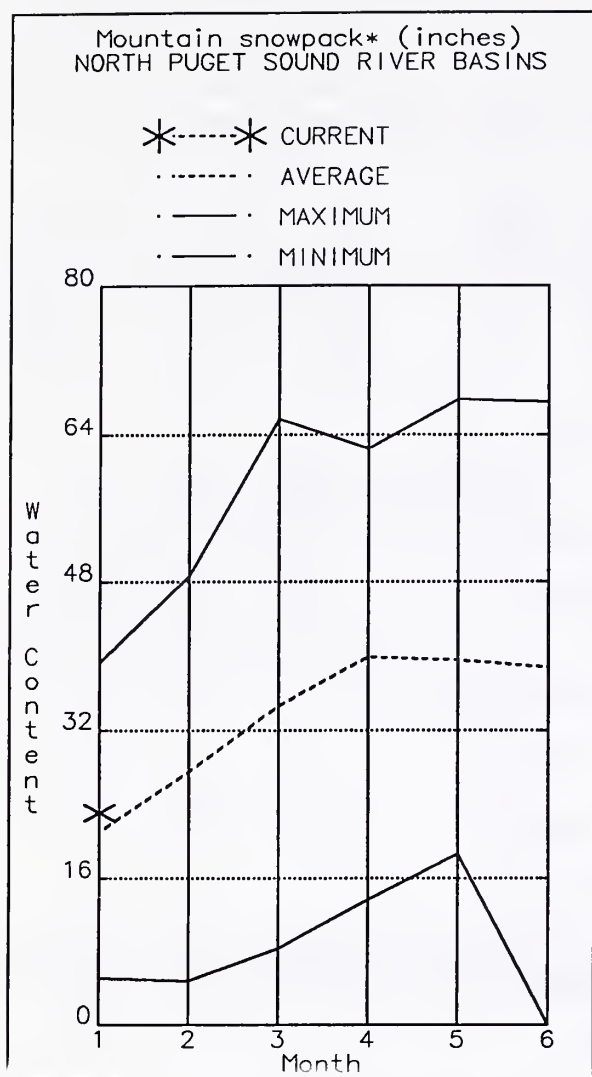
| WHITE - GREEN RIVER BASINS Reservoir Storage (1000 AF) - End of December | | | | | WHITE - GREEN RIVER BASINS Watershed Snowpack Analysis - January 1, 1992 | | | |
|---|-----------------|------------------------|-----------|-----|---|----------------------|-------------------|---------|
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | White River | 2 | 107 | 110 |
| | | | | | Green River | 7 | 74 | 80 |
| | | | | | Cedar River | 0 | 0 | 0 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



NORTH PUGET SOUND RIVER BASINS:

December streamflow in the Skagit River was 82% of average. Forecast for the Skagit River streamflow is 96% of normal for the spring and summer period. January 1 snow cover in the Skagit Basin is 123% of normal. Rainy Pass SNOTEL at elevation 4780 feet, has 21.3 inches of water content; normal January 1 water content is 15.4 inches. January 1 reservoir storage is above average, with Ross Lake reservoir at 143% of normal and 83% of capacity. Precipitation for December was 80% of average with a water year-to-date at 88% of normal. December temperatures were five degrees above normal.

NORTH PUGET SOUND RIVER BASINS
Streamflow Forecasts - January 1, 1992

| | | <<===== Drier ===== Future Conditions ===== Wetter =====>> | | | | | | | |
|------------------------------|-----------------|--|------|-----------------|--|-------|-----------------|-----------------|------------------------|
| Forecast Point | Forecast Period | Chance Of Exceeding * | | | | | | | |
| | | 90% (1000AF) | | 70% (1000AF) | 50% (Most Probable) (1000AF) (% AVG.) | | 30% (1000AF) | 10% (1000AF) | 30-Yr Avg. (1000AF) |
| | | | | | | | | | |
| ===== | | | | ===== | | ===== | | | |
| SKAGIT RIVER at Newhalem (2) | APR-SEP | 1560 | 1900 | 2140 | 95 | 2380 | 2720 | 2264 | |
| | APR-JUL | 1330 | 1620 | 1820 | 96 | 2020 | 2310 | 1891 | |
| | APR-JUN | 1030 | 1250 | 1400 | 97 | 1550 | 1770 | 1442 | |

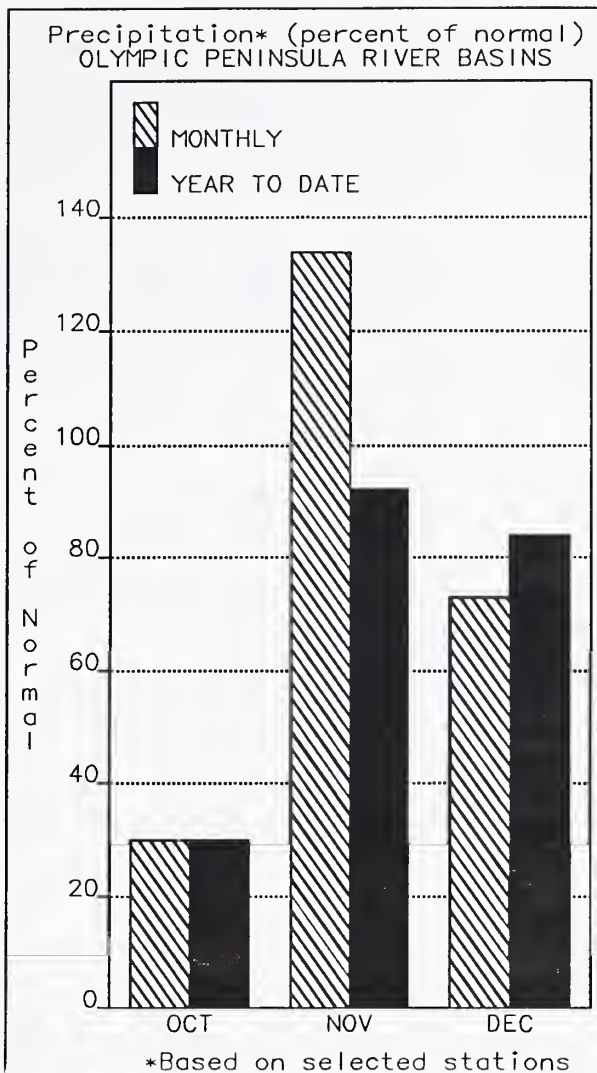
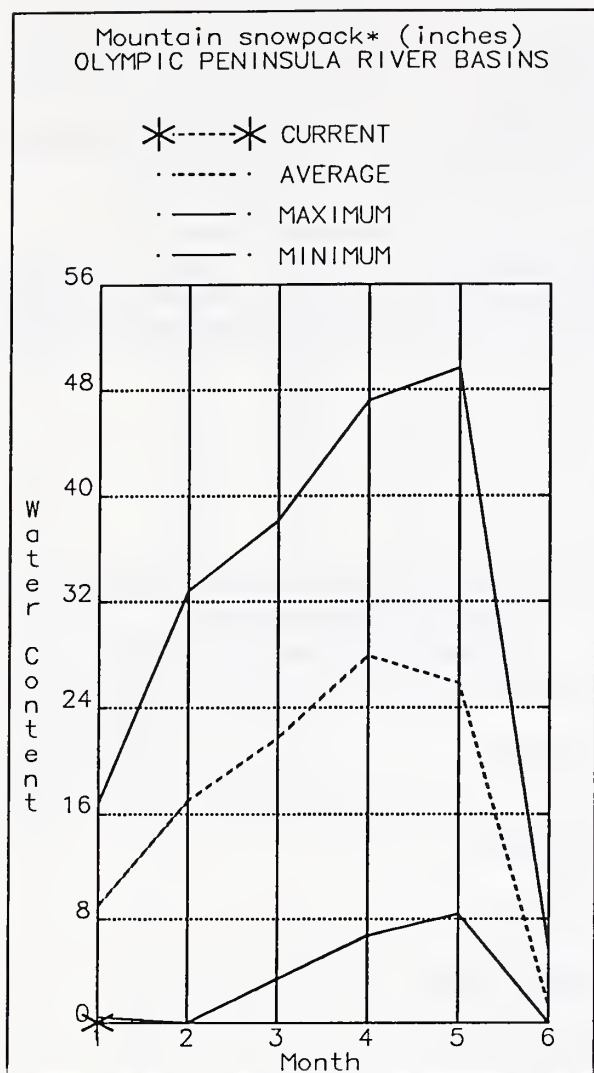
| NORTH PUGET SOUND RIVER BASINS Reservoir Storage (1000 AF) - End of December | | | | | NORTH PUGET SOUND RIVER BASINS Watershed Snowpack Analysis - January 1, 1992 | | | |
|---|-----------------|------------------------|-----------|-------|---|----------------------|-------------------|---------|
| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| ROSS | 1404.1 | 1161.5 | 1260.9 | 783.9 | Snoqualmie River | 1 | 80 | 79 |
| DIABLO RESERVOIR | 90.6 | 87.1 | 82.2 | --- | Skykomish River | 3 | 99 | 110 |
| GORGE RESERVOIR | 9.8 | 7.9 | 7.5 | --- | Skagit River | 3 | 59 | 123 |
| | | | | | Baker River | 0 | 0 | 0 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.



OLYMPIC PENINSULA RIVER BASINS:

December precipitation was 73% of average, with water year-to-date precipitation accumulation at 84% of normal. January 1 snow cover in the Olympic basin is below normal based on data from the Mount Crag SNOTEL. January forecasts of runoff for streamflow in the basin are for 90% of average on the Dungeness River and the Elwha River. The Big Quilcene can expect below normal runoff this summer. The Mount Crag SNOTEL near Quilcene had 4.2 inches on January 1, last year it had 6.2 inches. Temperatures were three degrees above normal for December.

OLYMPIC PENINSULA RIVER BASINS
Streamflow Forecasts - January 1, 1992

| Forecast Point | Forecast Period | <<===== Drier ===== Future Conditions ===== Wetter =====> | | | | | | 30-Yr Avg. (1000AF) | | |
|-----------------------------|--------------------|---|----------|---------------------|----------|----------|----------|------------------------|-------|--|
| | | Chance Of Exceeding * | | | | | | | | |
| | | 90% | 70% | 50% (Most Probable) | | 30% | 10% | | | |
| | | (1000AF) | (1000AF) | (1000AF) | (% AVG.) | (1000AF) | (1000AF) | | | |
| | | ===== | | | ===== | | ===== | | ===== | |
| DUNGENESS RIVER nr Sequim | APR-SEP | 107 | 126 | 139 | 87 | 152 | 171 | 159 | | |
| | APR-JUL | 97 | 113 | 123 | 95 | 133 | 149 | 129 | | |
| | APR-JUN | 74 | 85 | 93 | 96 | 101 | 112 | 97 | | |
| ELWHA RIVER nr Port Angeles | APR-SEP | 390 | 455 | 500 | 90 | 545 | 610 | 553 | | |
| | APR-JUL | 325 | 380 | 415 | 91 | 450 | 505 | 454 | | |

OLYMPIC PENINSULA RIVER BASINS
Reservoir Storage (1000 AF) - End of December

OLYMPIC PENINSULA RIVER BASINS
Watershed Snowpack Analysis - January 1, 1992

| Reservoir | Usable Capacity | *** Usable Storage *** | | | Watershed | Number of Data Sites | This Year as % of | |
|-----------|-----------------|------------------------|-----------|-----|-----------------|----------------------|-------------------|---------|
| | | This Year | Last Year | Avg | | | Last Yr | Average |
| | | | | | | | | |
| | | | | | Elwha River | 0 | 0 | 0 |
| | | | | | Morse Creek | 0 | 0 | 0 |
| | | | | | Dungeness River | 0 | 0 | 0 |
| | | | | | Quilcene River | 0 | 0 | 0 |
| | | | | | Wynoochee River | 0 | 0 | 0 |

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.

(2) - The value is natural flow - actual flow may be affected by upstream water management.

